

Nidec

尼得科

All for dreams

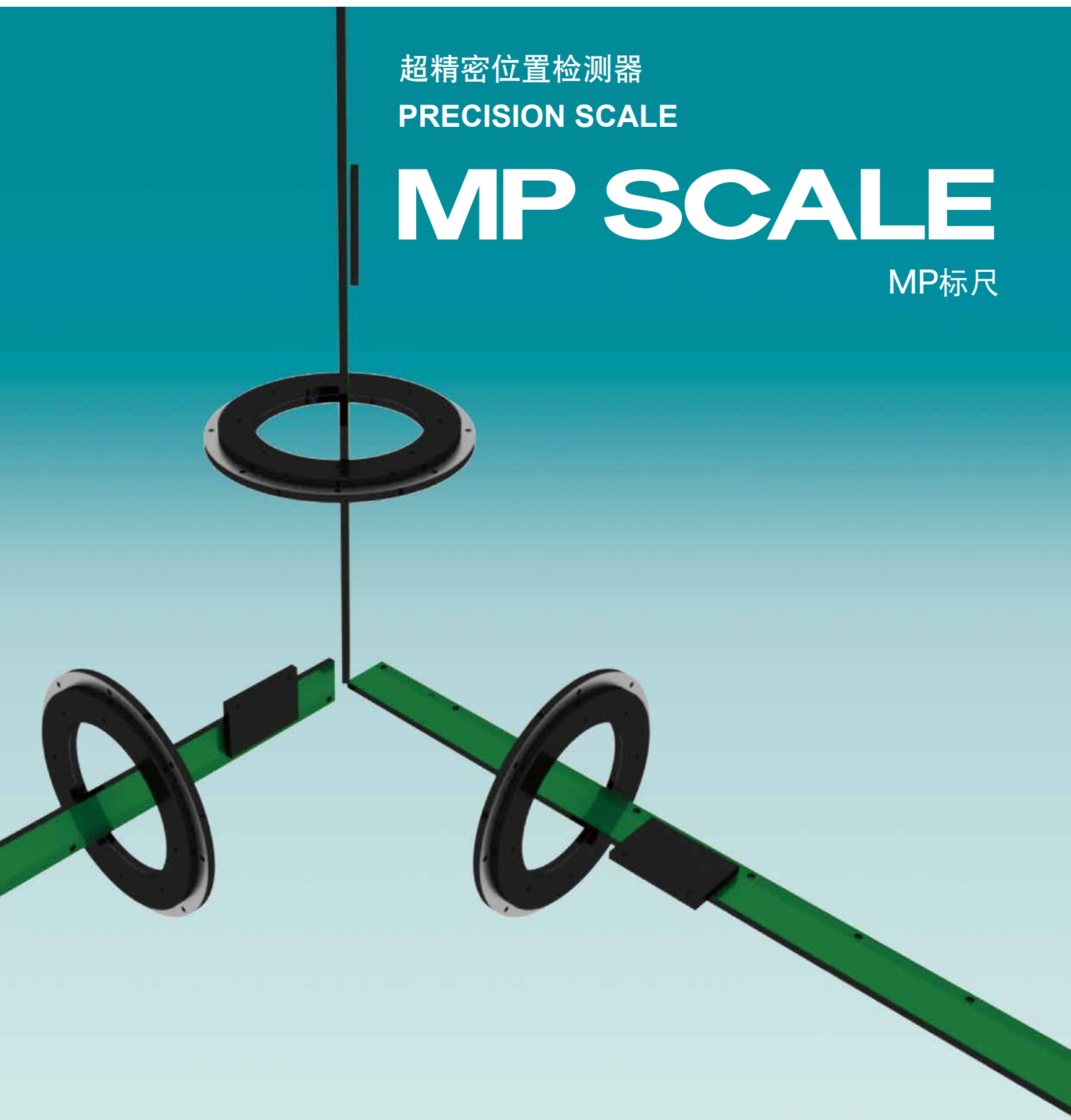
北京天瑞宜成精密机械有限公司 微信83520770

超精密位置检测器

PRECISION SCALE

MP SCALE

MP标尺



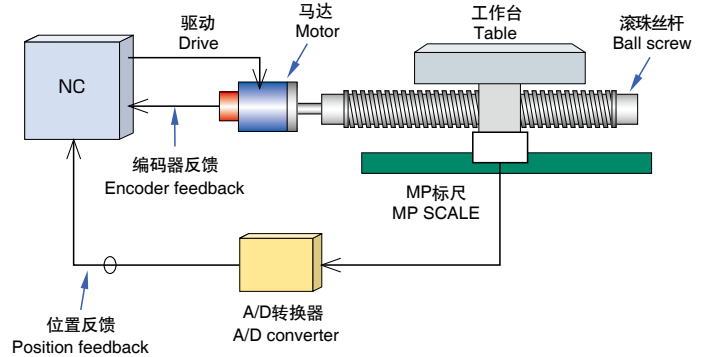
超精密位置检测器 Ultra-Precision Position Detector

MP标尺是利用电磁耦合，以非接触方式精确检测长度和角度变化的超高精度位置检测器。

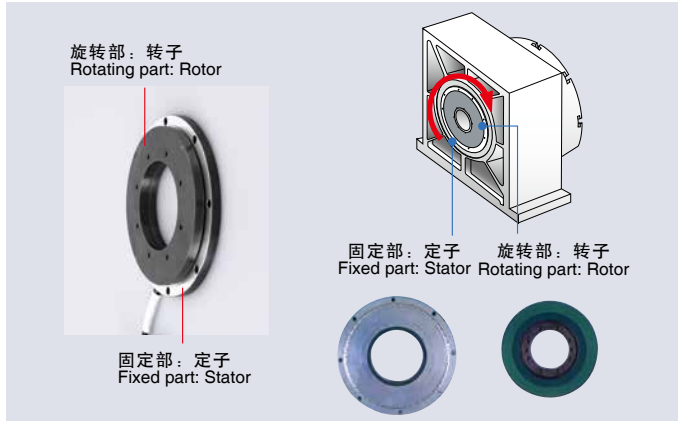
Precision Scale (MP SCALE) is a non-physical contact, ultra-precision position detector used for detecting linear or angular positions utilizing the inductive coupling principle.

MP标尺检测到机械的移动量，通过A/D转换器转换为数字信号，将其作为位置反馈信号返回控制装置（例如，NC装置）。根据MP标尺检测到的位置反馈，NC装置可以通过全闭环控制将机械进行正确定位。

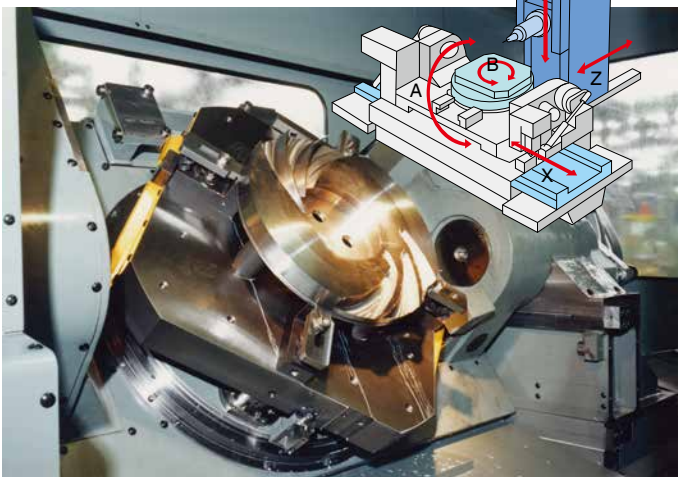
MP SCALE detects the amount of movement of a machine and outputs an analog signal. This signal is converted into a digital signal by an A/D converter and fed back to the NC system. Thus the machine can be controlled accurately by the fully closed-loop NC system based on the position feedback data from the MP SCALE.



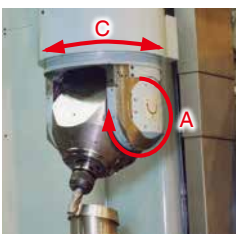
旋转MP标尺 Rotary MP scale



使用旋转工作台进行的5轴加工
5-axis machining utilizing a rotary table



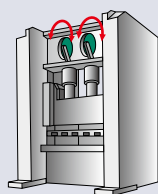
5轴头
5-axis head



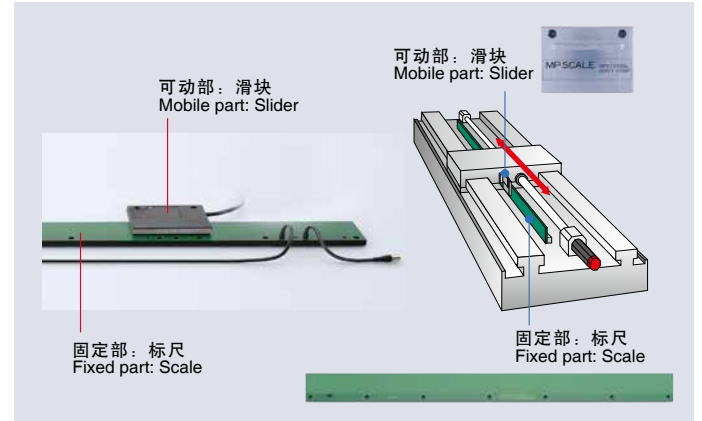
伺服冲压机
Servo press

伺服冲压机左右曲轴同步运转，实现高精度冲压作业。

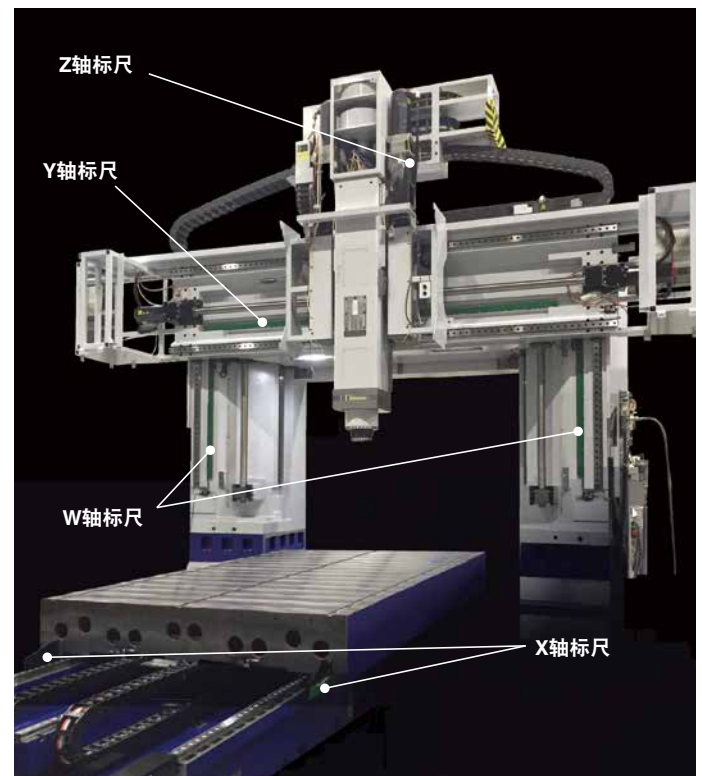
A right and left crank of the servo press is synchronized, and highly accurate press processing is achieved.



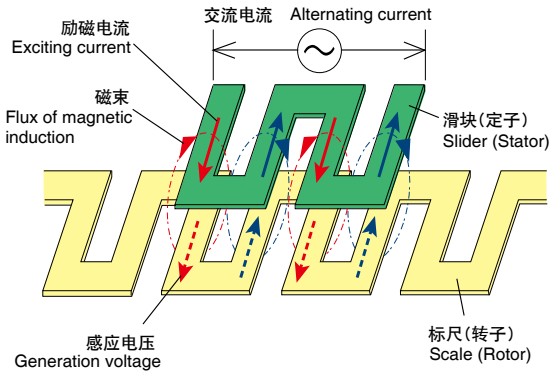
直线MP标尺 Linear MP scale



大型高精度加工机
Large Precision Machines



原理 Principle

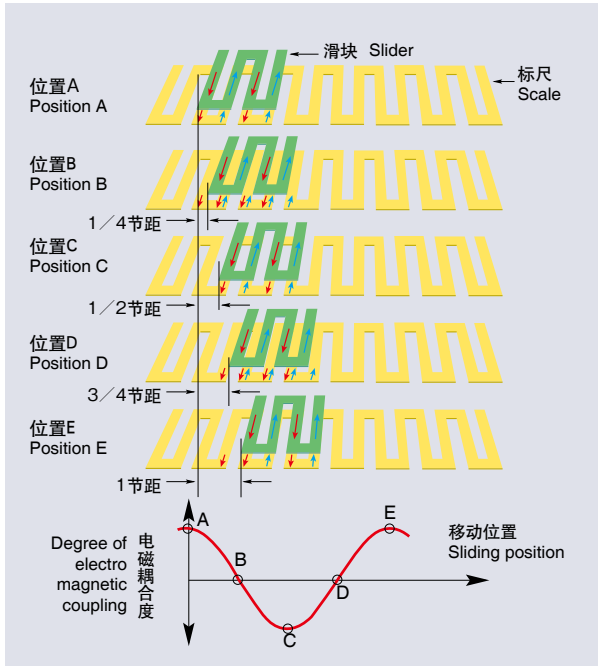


- 1 滑块（定子）和标尺（转子）上都设置有梳形格栅。
- 2 当交流电流流经滑块（定子）的格栅时，由于电磁感应作用，标尺上会产生电压。
- 3 当滑块（定子）与标尺（转子）的位置发生变化时，产生的电压也会发生变化。根据发生变化的电压检测位置。

- 1 The induction pattern, in the rectangular form, is printed on both Slider and Scale in linear type and Stator and Rotor in Rotary type MP SCALE.
- 2 When the alternating current is fed to Slider (Stator) pattern, the voltage is energized to Scale (Rotor) due to the inductive coupling action.
- 3 The energized voltage will vary as the relative position of Scale (Rotor) and Slider (Stator) changes. The position of the machine is detected based on the variation of this voltage.

电磁耦合位置引起的变化

Change in degree of the inductive coupling due to the relative position of Slider and Scale

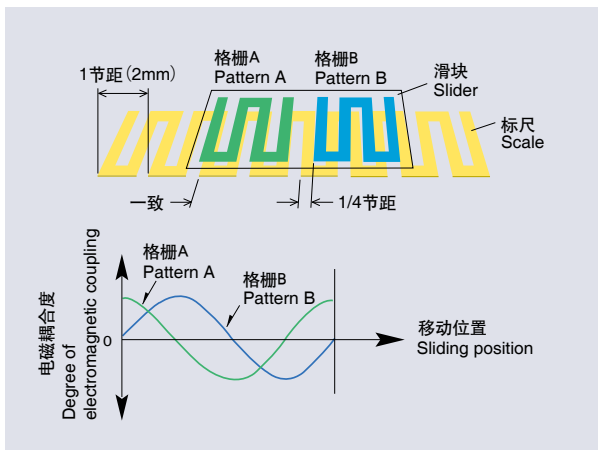


- 1 在位置A，标尺的格栅与滑块的格栅相同，因此，电磁耦合为正方向最大。
- 2 在标尺错位1/4节距的位置B，滑动格子位于标尺格子中间，流向滑块两个方向的电流的影响相等，电磁耦合为零。
- 3 错位1/2节距的位置C，与位置A的方向相反，电磁耦合为负方向最大。
- 4 错位3/4节距的位置D，与位置B的位置关系相同，电磁耦合为零。
- 5 错位1节距的位置E与位置A相同。电磁耦合受移动位置的影响，成为没有误差的SIN结合。

- 1 At position A, the degree of the inductive coupling is the maximum in the positive direction as the patterns of both Slider and Scale coincide with each other.
- 2 At position B, Slider is shifted by 1/4 of a pitch relative to the Scale pattern, the current that flows in both direction of Slider cancels out the flow in Scale, thus nullifying the degree of the inductive coupling.
- 3 At position C, where Slider is shifted by 1/2 of a pitch relative to the Scale pattern the situation is reverse to that of position A, thus the degree of the inductive coupling is maximum in the negative direction.
- 4 At position D, where Slider is shifted by 3/4 of a pitch relative to the Scale pattern, the situation is similar to that of position B, thus nullifying the degree of the inductive coupling.
- 5 At position E, where Slider is shifted by 1 pitch relative to the Scale pattern, the situation is similar to that of position A. The induction coupling is a flawless sine curve regardless of its sliding position.

实际的滑块格栅

Actual patterns of Slider



滑块上备有错位1/4节距的两个格栅，针对位置进行SIN与COS电磁耦合。使用这两个格栅，可能不受缝隙等的变化影响，进行高精度的位置检测。

Slider comprises two patterns set at 1/4 a pitch apart. This enables generation of the sine and cosine curve inductive coupling. The extremely precise position detection is made possible without any effect of change in the difference of the gap between Scale and Slider as Slider moves along the applied axis.

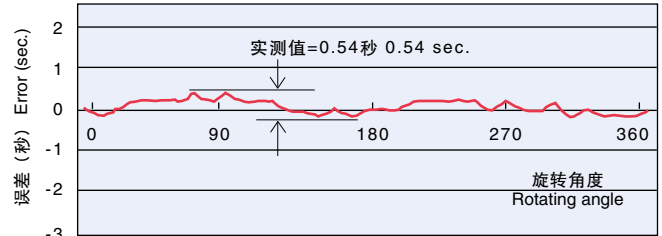
超精密位置检测器 Ultra-Precision Position Detector

特点 Features

1 高精度 High accuracy



直线 Linear: $2\ \mu\text{m}$ (保证值、MPS-25ASC)
 旋转 Rotary: 2秒 2 sec (保证值、MPI-1272B)
 (所有精度以幅宽进行表示)



以上数据为本公司内部在20°C恒温室的实测结果

2 高分辨率/高速 High resolution /High speed



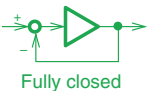
直线 Linear: $0.1\ \mu\text{m}/80\ \text{m}/\text{min}$ (A相/B相输出 Phases A/B output)
 $0.01\ \mu\text{m}/1800\ \text{m}/\text{min}$ (序列I/F Serial I/F)
 $0.0001^\circ/222\ \text{min}^{-1}$ (A相/B相输出 Phases A/B output)



旋转 Rotary: $2^{23}/\text{旋转一次}$ (0.000043°) / $10,000\ \text{min}^{-1}$ (序列I/F Serial I/F)

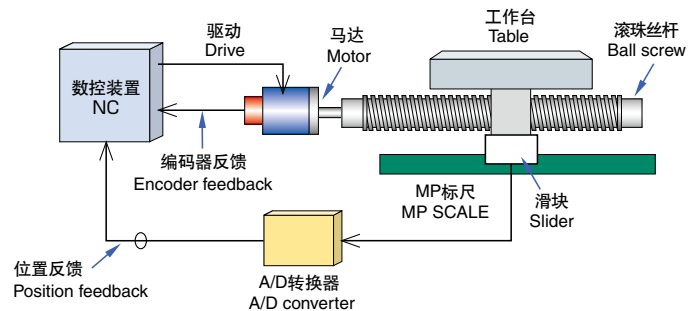
上述数值为代表值。Above data is typical.

3 直接检测 Direct detection



由驱动系统最终检测，不受滚珠丝杠伸长的影响。

There is no effect of the ball screw expansion as Scale is mounted to the final moving element of the machine.



4 耐污染、耐油、耐结露 Unaffected by dust, oil, and condensation



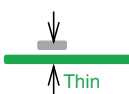
电磁感应式检测不受缝隙中油污、灰尘、结露的影响。也无需空气净化。

Due to the adoption of electromagnetic inductive detection method, the position can be detected without influence from oil contamination, dust, and condensation in the gap between Slider and Scale. Air purge is unnecessary.

使用7年后的标尺实例
 即使附着有大量铸件粉尘及油污等也可顺畅运转
Example of Scale used for 7 years
 Even if cast powder and oil adhere mostly, it is under operation satisfactory.

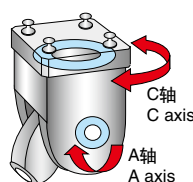


5 节省空间 Small mounting space

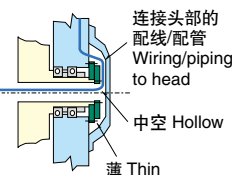


- 薄: 厚度14~20mm
- 旋转标尺为中空结构。
- 能够安装于可获得高精度的合理位置。

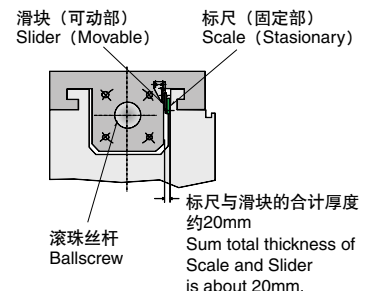
- Thin : Thickness is 14-20mm.
- Rotary Scale has big center hole
- Mounting at most suitable position where high precision is obtained is possible.



5轴头的A轴
A axis of 5 axis head

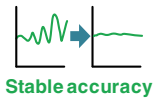


5轴头的A轴截面
Sectional view of 5 axis head A axis



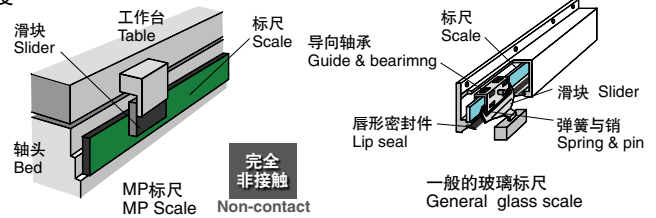
滑块(可动部)
Slider (Movable)
标尺(固定部)
Scale (Stationary)
标尺与滑块的合计厚度约20mm
Sum total thickness of Scale and Slider is about 20mm.

6 非接触！没有摩擦部，可长期保持稳定精度 Non-contacting! Stable high accuracy lasted for a long period.



MP标尺是没有轴承和弹簧的完全非接触式，因此，测量精度不会伴随时间变化而下降。

MP SCALE will last for years without any deterioration in accuracy because of its non-physical contact design that eliminates any bearing or spring.

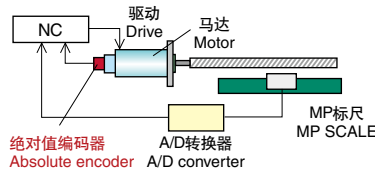


7 绝对值检测 Absolute feedback system



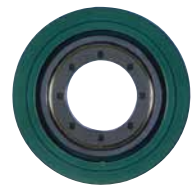
和安装在马达上的绝对值编码器组合，增量式检测的标尺也可进行绝对值检测。提供了用编码器检测大致位置，用MP标尺检测精密位置的NC系统。（刀补绝对值方式）

By combining the absolute battery-backed-up encoder mounted on the feed motor, the NC system provides the method in which the encoder detects the rough absolute position and the MP SCALE detects the fine position. (Offset absolute system)



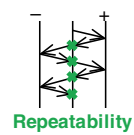
可进行绝对值检测的内置A/D转换器的一体式标尺MPRZ系列，适合作为直驱马达的检测器。

MPRZ series detects the absolute value using an independent Scale. Highly suitable for detector of DD motor.



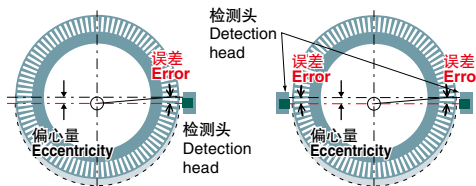
绝对值标尺
Absolute value scale
MPRZ

8 高重复定位精度 High repeatability



即使机械旋转方向和工件的重重导致轴发生变形和偏心，偏心也不会导致读取误差，可以得到较高的重复精度。

Eccentricity often occurs according to shaft movement by the difference in the rotation direction or eccentric work load. With MP SCALE, eccentricity does not cause big detecting error and high repeatability is acquired.



一般的1头标尺
General scale with one head

与偏心量成比例形成读取误差，重复精度比较低。

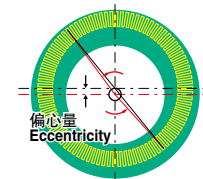
Since the detecting error is in proportion to the quantity of eccentricity, repeatability is bad.

注：“一般的”指常见的磁栅尺、光栅尺

一般的标尺偏心对策
General countermeasure to eccentricity on scale

安装两个检测头消除误差。

Detection error is canceled by two detection heads.

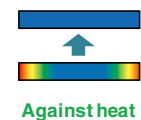


MP标尺
MP SCALE

通过在圆周配置大量检测格栅，进一步消除偏心误差，可以得到较高的重复精度。

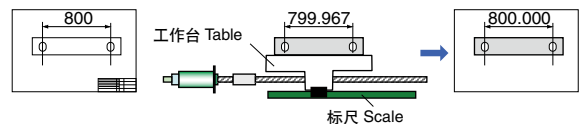
By arranging many detection patterns all over the circumference, the error of eccentricity is canceled and high repeatability is acquired.

9 与铁具有相同热膨胀率，可进行高精度加工 High accuracy machining possible since heat expansion of Scale is same as iron



即使在17°C时进行加工，在20°C以内仍能达到指定尺寸。

Even if machined at 17°C, directed dimension is realizable at 20°C.



加工图纸指示
Machining direction in drawing

在17°C时加工
Machining at 17°C

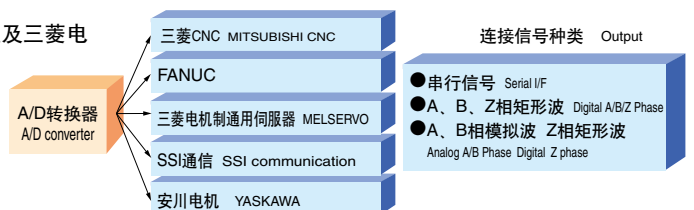
20°C的测量室
In measuring room at 20°C

10 可以连接各公司的数控装置和伺服放大器 Various NC interfaces



可以连接三菱CNC、FANUC、西门子各家公司的数控装置及三菱电机的通用伺服、安川ΣV和Σ7。适用于通用SSI通信。

A/D converter can be connected to NC systems built by MITSUBISHI CNC, FANUC, SIEMENS, and AC servo by MITSUBISHI and YASKAWA ΣV & Σ7. SSI communication is applicable as general code for serial interface.

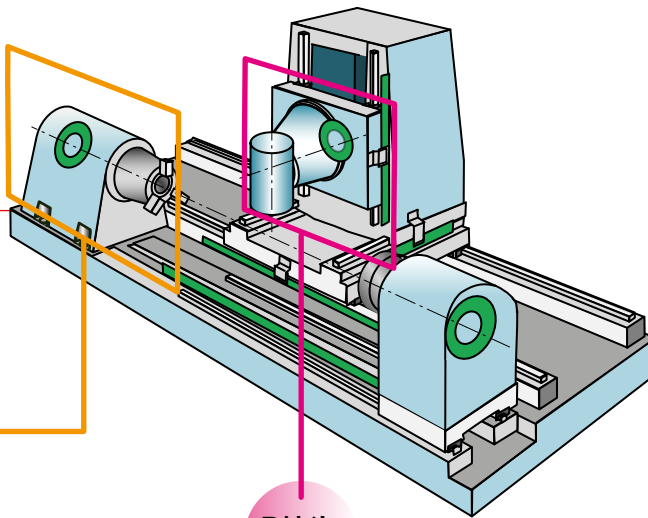


注：安川ΣV和Σ7的连接，仅适用于直驱马达。

Note: Connection of YASKAWA ΣV & Σ7 is only applicable in the case of DD motor.

旋转MP标尺的用途和选定 Purpose and Selection of Rotary MP SCALE

在复合车床中
For Turning Center



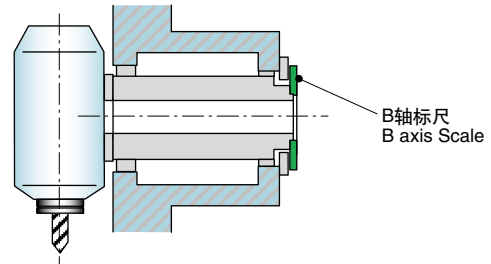
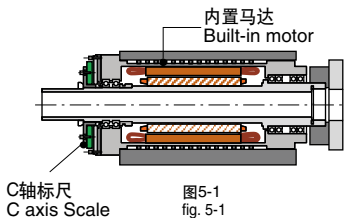
主轴头
For Spindle Head

B轴头
For B Axis Head

内置式主轴 Built-in Spindle

如果可以将MPCI系列安装到主轴,再连接到主轴放大器,可实现高精度的主轴控制与C轴控制。

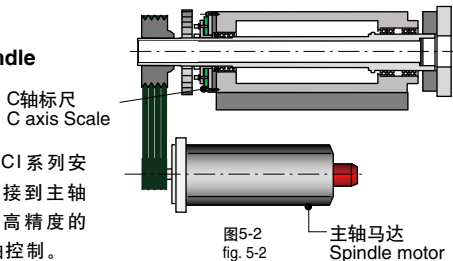
If MPCI series Scale is mounted on spindle and the output is connected to spindle amplifier, highly precise spindle control and C axis control are possible.



皮带式主轴 Belt-type Spindle

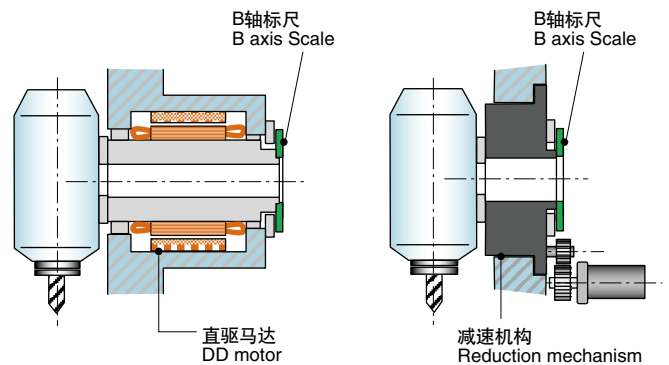
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在直驱马达中 For Direct Drive Motor

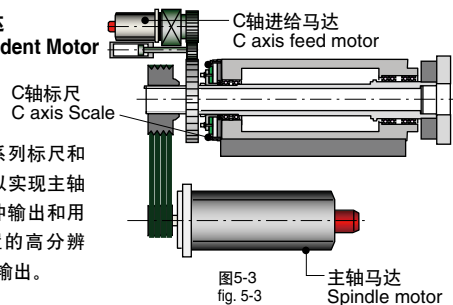
带减速机构 For Using Reduction Mechanism



C轴分体式马达 C Axis Independent Motor

组合1个MPCI系列标尺和ADB-20J16,可以实现主轴控制的1024脉冲输出和用于检测C轴位置的高分辨率输出的双系统输出。

By combining ADB-20J16 and one MPCI series Scale, both output for spindle control 1024 pulse and for C axis positioning detection of high resolution are possible.



主轴和C轴控制中选择可支持各控制方式的MPCI系列。
MPCI series applicable to each control system is selected for spindle control and C axis control.

MPCI系列
MPCI series

车床 主轴·C轴用
For Spindle and C axis of Lathe

参照第10页
Refer to page 10

在直驱马达中,选定高速、高精度地检测绝对值的MPZA系列或MPRZ系列。
MPZA series or MPRZ series Scales which detect the absolute data with high speed and high precision are selected for DD motor.

MPZA系列
MPZA series

内置A/D转换器
Built-in A/D converter

参照第7页
Refer to page 7

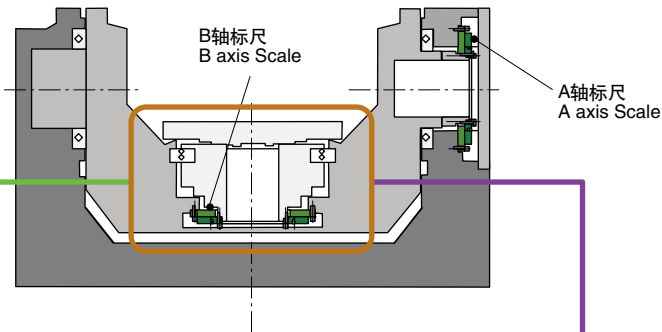
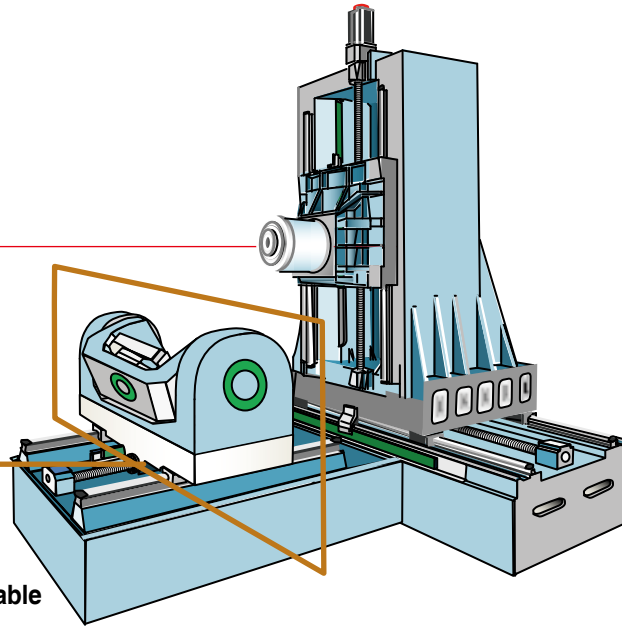
MPRZ系列
MPRZ series

种类多
Various

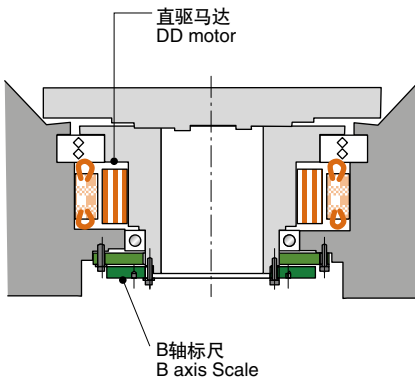
参照第7页
Refer to page 7

在加工中心中
For Machining Center

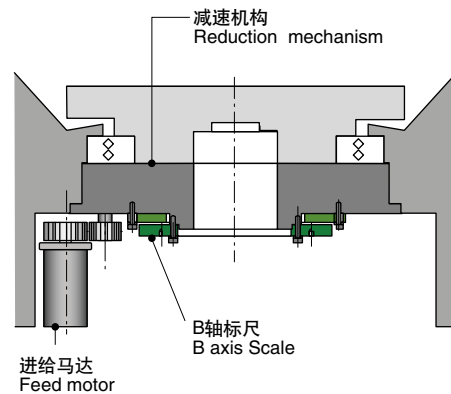
工作台的B轴和A轴
For A Axis and B Axis of Table



在直驱马达中
For Direct Drive Motor



带减速机构
For Using Reduction Mechanism



由于带减速机构中的驱动系统带有进给马达,通过使用进给马达中备用电池的绝对值编码器,增量式的MPI系列旋转MP标尺也可进行绝对值检测。

带减速机构,选定MPZA系列、MPRZ系列和MPI系列。

Feed motor is used in the drive system in case of the reduction mechanism. By using the battery backed-up encoder on feed motor, the absolute detection is possible, even if incremental MPI series Rotary MP SCALE, MPZA series, MPRZ series, and MPI series are selected.

※在FANUC或三菱CNC的NC中,如果增量MPI系列也能在进给马达中使用备用电池的编码器,也可以进行绝对值检测(和补偿功能的组合)。

※In case of FANUC or MITSUBISHI CNC, if the battery backed-up encoder is used on feed motor, the absolute output (as the offset function) is possible even if using incremental MPI series.

MPZA系列
MPZA series

绝对值、内置A/D转换器
Absolute, Built-in A/D converter

▶ 参照第7页
Refer to page 7

MPRZ系列
MPRZ series

绝对值、种类多
Absolute, Various

▶ 参照第7页
Refer to page 7

MPI系列
MPI series

增量
Incremental

▶ 参照第9页
Refer to page 9

旋转角度检测器
Rotary Feedback Detector

MPZA系列&MPRZ系列 绝对值旋转MP标尺

MPZA Series & MPRZ Series Absolute Value Rotary MP SCALE

用途 Usage

适于直驱马达及超精密旋转工作台的位置检测器

Highly suitable for absolute feedback detector of direct drive motor and precise rotation table

MPZA系列和MPRZ系列的共同特点

Features common to MPZA series and MPRZ series

ABS

① 不需要备用电池的绝对值检测方式

Absolute system without battery backup

MPZA系列的特点 Features of MPZA series



Space saving

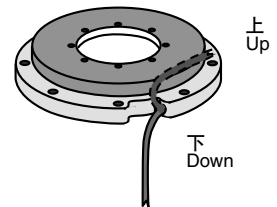
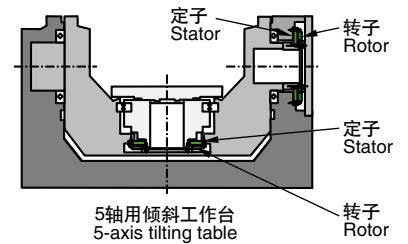
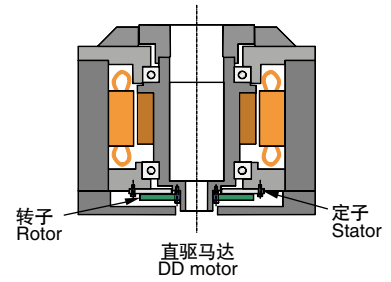
① A/D转换器内置于标尺中，不需要安装空间

With built-in A/D converter, mounting space is unnecessary.



② 配线可自由向上/下/侧边拉出

Wiring can be output in three directions: up, down and side.



规格 Specifications

MPZA 系列 Series

标尺类型 Scale type	全周精度 ^{※1} Accuracy	重量 ^{※2} Weight	刻度间距 Graduation pitch	输出信号 Output signal	分辨率 Resolution	最高转速 Max. speed	标尺类型 Scale type	连接NC NC
MPZA-2024A-23bit	5秒 5 sec	1.2 kg	3度 3 deg	序列I/F Serial interface	2 ²³ /rev (0.043×10 ⁻³ deg)	10,000 min ⁻¹	MPZA-****A-23bit-F	FANUC
MPZA-10036A-23bit	4秒 4 sec	2.7 kg	2秒 2 deg				MPZA-****A-23bit-M	三菱 MITSUBISHI CNC
							MPZA-****A-23bit-S	SSI (SIEMENS)

MPRZ 系列 Series

标尺类型 Scale type	全周精度 ^{※1} Accuracy	重量 ^{※2} Weight	刻度间距 Graduation pitch	适用A/D转换器 Applicable A/D converter					
				标尺类型 Scale type	连接NC NC	A/D转换器类型 Type	输出信号 Output signal	分辨率 Resolution	最高转速 Max. speed
MPRZ-536A	4秒 4 sec	1.0 kg	2度 2 deg	MPRZ-536A	FANUC	ADB-K70F	序列I/F Serial interface	2 ²³ /rev (0.043×10 ⁻³ deg)	10,000 min ⁻¹
MPRZ-736B	3秒 3 sec	2.0 kg		MPRZ-736B	三菱 MITSUBISHI CNC	ADB-K70M			
MPRZ-1036B	2.5秒 2.5 sec	3.9 kg		MPRZ-1036B					
MPRZ-1236B	2秒 2 sec	6.4 kg		MPRZ-1236B	SSI (SIEMENS)	ADB-K70S			
MPRZ-9636A	4秒 4 sec	2.7 kg		MPRZ-9636A	安川 YASKAWA ΣV&Σ7	ADB-20J82			
MPRZ-12536A	4秒 4 sec	2.5 kg		MPRZ-12536A					
MPRZ-18072A	2秒 2 sec	7.5 kg	1度 1 deg	MPRZ-18072A	FANUC	ADB-K70F	5,000 min ⁻¹		
				三菱 MITSUBISHI CNC	ADB-K70M				
				SSI (SIEMENS)	ADB-K70S				

※1: 全周精度为标尺旋转一次的精度，以秒-p表示，不包括插补精度。
※2: 重量不包括配线。

※1: Positioning error shows peak-to-peak within 1 rotation. Interpolation error (error within 1 pitch of Scale) is not included.
※2: Wiring is not included in weight.

注) 标尺的通用规格请参照第12页。

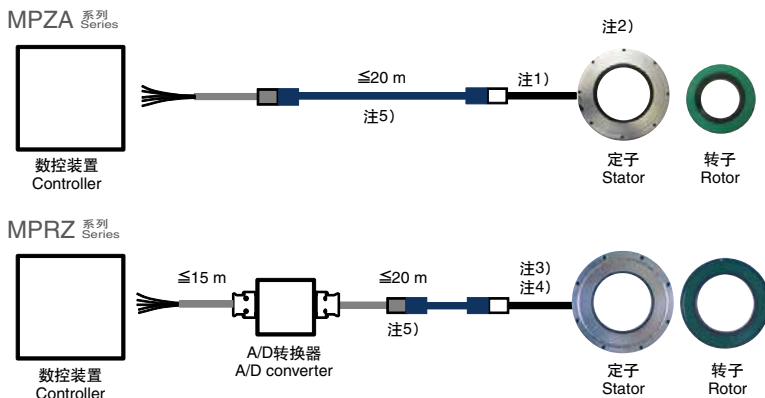
Note: Refer to page 12 for Scale common specifications.

只有在直驱马达时才能使用安川的ΣV和Σ7系统。

Connection of YASKAWA ΣV & Σ7 is only applicable in the case of DD motor.

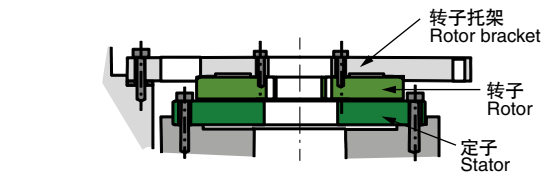
构成 Configuration

安装事例 Mounting Example

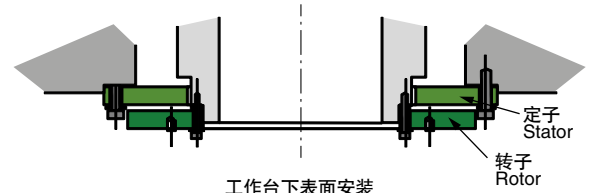


- 注1) MPZA系列的定子附属1.5m的引出线和连接器。
- 注2) MPZA系列的A/D转换器内置在定子中。
- 注3) MPRZ系列从标尺的引出线长度因机型而异。
- 注4) MPRZ系列不标配标尺引出线的连接器。请在订购标尺时指定为带连接器。
- 注5) 转接位置尽可能地要少。
- 注6) 提供延长电缆作为选配件。

- Note 1: In MPZA series, 1.5 m cable and connector are attached to the Stator.
- Note 2: In MPZA series, A/D converter is built in the Stator.
- Note 3: In MPRZ series, the length of the cable attached to the Scale differs with the each models.
- Note 4: In MPRZ series, as standard, the connector of the cable is not attached. Please specify connector attached to the Scale when ordering.
- Note 5: Please limit the number of relay connections as much as possible.
- Note 6: The extended cables are prepared as the option.



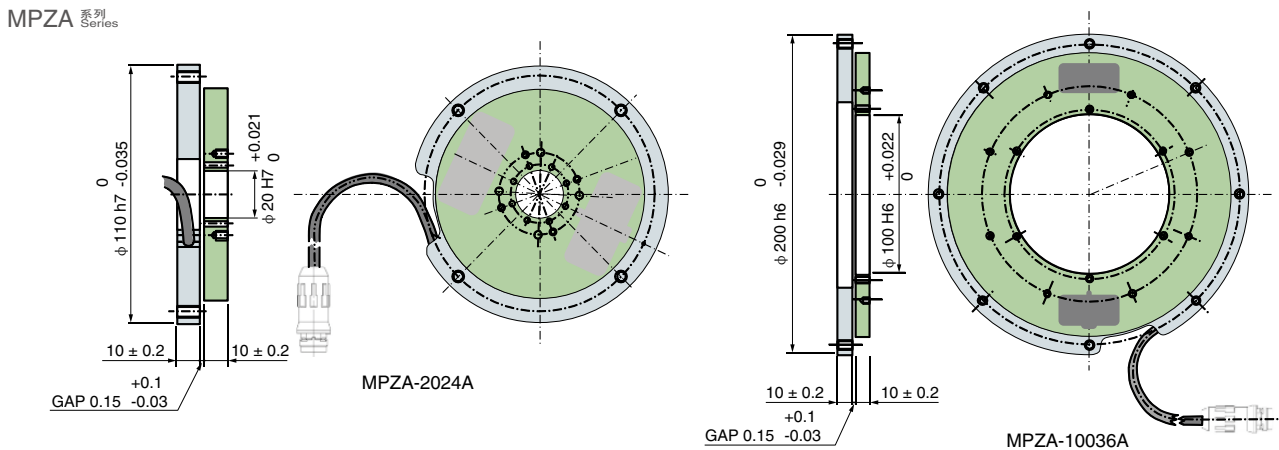
工作台上表面安装
Mounting at upper part of table



工作台下表面安装
Mounting at bottom of table

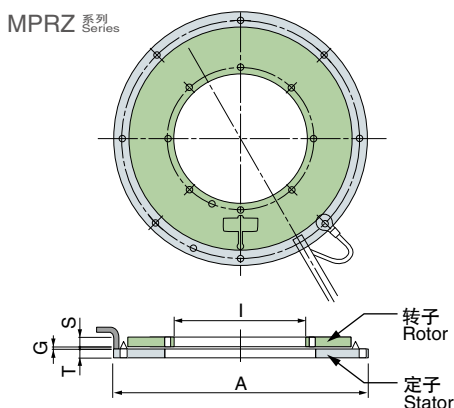
旋转 Rotary

尺寸图 Dimensions



- 注) 配线的输出方向可以是上、下、侧边任一方向。
- 注) 各部分的尺寸请参照主页或是向我们索取使用说明书。

- Note: Output direction of wiring is possible in any top, bottom or horizontal direction.
- Note: Please refer to the drawings in our homepage or request the instruction manuals from us and refer to them for the detailed dimensions.



单位 Unit: mm

类型 Type	A (外径)	I (内径)	S (转子厚度)	G (间隙)	T (定子厚度)	配线引出方向 Wiring exit
MPRZ-536A	127.0 ⁰ _{-0.1}	27.1 ^{+0.1} ₀	7.01±0.07	0.15 ^{+0.1} _{-0.03}	6.99±0.07	上 Top
MPRZ-736B	177.8 ⁰ _{-0.1}	58.0 ^{+0.1} ₀	8.01±0.07		7.99±0.07	
MPRZ-1036B	251.7 ⁰ _{-0.1}	90.0 ^{+0.1} ₀	8.01±0.07	0.25±0.13	7.99±0.07	
MPRZ-1236B	302.0 ⁰ _{-0.1}	120.0 ^{+0.1} ₀	9.41±0.07		9.39±0.07	
MPRZ-9636A	200.0 ⁰ _{-0.029}	96.0 ^{+0.035} ₀	10.02±0.07		7.99±0.07	
MPRZ-12536A	230.0 ⁰ _{-0.029}	125.0 ^{+0.025} ₀	8.01±0.07	0.25±0.13	7.99±0.07	侧 Side
MPRZ-18072A	340.0 ⁰ _{-0.025}	180.0 ^{+0.025} ₀	9.41±0.07	0.25 ^{+0.1} _{-0.03}	9.39±0.07	上 Top

- 注) 各部分的尺寸请参照主页或是向我们索取使用说明书。
- Note: Please refer to the drawings in our homepage or request the instruction manuals from us and refer to them for the detailed dimensions.

旋转角度检测器
Rotary Feedback Detector

MPI系列 增量式旋转MP标尺
MPI Series Incremental-type Rotary MP SCALE

用途 Usage

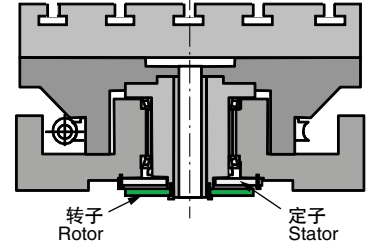
高精度旋转工作台的旋转轴及倾斜轴
For high accuracy rotary axis and tilt axis of rotary table

特点 Features

ABS

① 可与马达的备用电池编码器组合进行绝对值检测

Absolute detection is possible, combining the battery backed-up encoder on the feed motor. (In case of FANUC and MITSUBISHI CNC)



规格 Specifications

标尺 Scale			
标尺类型 Scale type	全周精度※1 Accuracy	重量※2 Weight	刻度间距 Graduation pitch
MPI-536A	4秒 4 sec	1.0 kg	2度 2 deg
MPI-736B	3秒 3 sec	2.0 kg	
MPI-1072B	2.5秒 2.5 sec	3.9 kg	1度 1 deg
MPI-1272B	2秒 2 sec	6.5 kg	

适用A/D转换器 Applicable A/D converter					
标尺类型 Scale type	连接NC NC	A/D转换器类型 Type	输出信号 Output signal	分辨率 Resolution	最高转速 Max. speed
MPI-536A MPI-736B	FANUC	ADB-K60F	序列I/F Serial interface	0.10×10 ⁻³ 度 deg	10,000 min ⁻¹
	三菱 MITSUBISHI CNC	ADB-K60M		0.05×10 ⁻³ 度 deg	
MPI-1072B MPI-1272B	各种装置 Various equipment	ADB-20J10	A相、B相、Z相 矩形波输出 Digital A, B and Z phase output	0.10×10 ⁻³ 度 deg	222 min ⁻¹
	FANUC	ADB-K60F	序列I/F Serial interface	0.05×10 ⁻³ 度 deg	5,000 min ⁻¹
	三菱 MITSUBISHI CNC	ADB-K60M		0.05×10 ⁻³ 度 deg	
各种装置 Various equipment	ADB-20J10	A相、B相、Z相 矩形波输出 Digital A, B and Z phase output	0.05×10 ⁻³ 度 deg	111 min ⁻¹	

※1: 全周精度为标尺旋转一次的精度, 以秒p-p表示, 不包括插补精度。

※1: Positioning error shows peak-to-peak within 1 rotation. Interpolation error (error within 1 pitch of Scale) is not included.

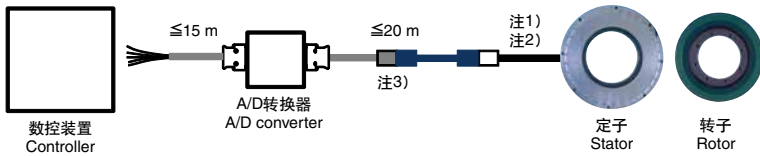
※2: 重量不包括配线。

※2: Wiring is not included in weight.

注) 标尺的通用规格请参照第12页。

Note: Refer to page 12 for Scale common specifications.

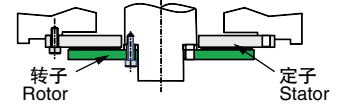
构成 Configuration



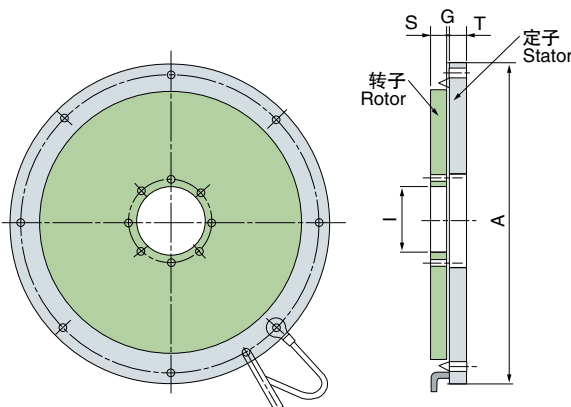
- 注1) 标尺的引出线长度请确认规格。
- 注2) 标尺引出线的连接器没有标配。订购标尺时指定为带标尺连接器。
- 注3) 转接位置尽可能地要少。
- 注4) 提供延长电缆作为选配件。

- Note 1: Please confirm specifications for the length of the cable attached to the Scale.
- Note 2: As standard, the connector of the drawer cable is not attached. Please specify the Scale with the connector when ordering.
- Note 3: Please limit the number of relay connections as much as possible.
- Note 4: The extended cables are prepared as the option.

安装事例 Mounting Example



尺寸图 Dimensions



类型 Type	单位 Unit: mm				
	A (外径)	I (内径)	S (转子厚度)	G (间隙)	T (定子厚度)
MPI-536A	127.0 ⁰ _{-0.1}	27.1 ^{+0.1} ₀	7.01±0.07	0.15 ^{+0.1} _{-0.03}	6.99±0.07
MPI-736B	177.8 ⁰ _{-0.1}	58.0 ^{+0.1} ₀	8.01±0.07		7.99±0.07
MPI-1072B	251.7 ⁰ _{-0.1}	90.0 ^{+0.1} ₀	8.01±0.07	0.25±0.13	7.99±0.07
MPI-1272B	302.0 ⁰ _{-0.1}	120.0 ^{+0.1} ₀	9.41±0.07		9.39±0.07

注) 各部分的尺寸请参照主页或是向我们索求使用说明书。
Note: Please refer to the drawings in our homepage or request the instruction manuals from us and refer to them for the detailed dimensions.

旋转角度检测器
Rotary Feedback Detector

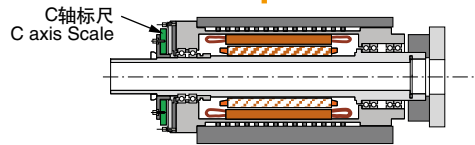
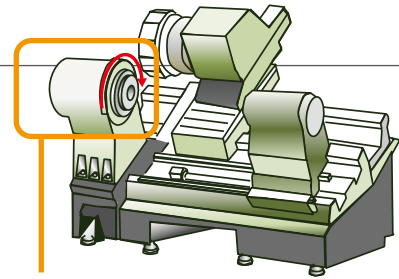
MPCI系列 带一次旋转检测的旋转MP标尺
MPCI Series Rotary MP SCALE with One-revolution Detection

用途 Usage

带一次旋转检测可进行高速旋转，适合车床主轴用
Highly suitable for lathe spindle due to high speed rotation and one-revolution

特点 Features

- ① 旋转一次就会输出一次Z相
One Z phase output per revolution
- ② 内径尺寸 $\phi 70\sim 340\text{mm}$
Inner diameter $\phi 70\sim 340\text{ mm}$



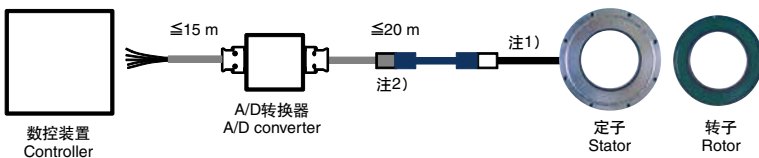
规格 Specifications

标尺 Scale			
标尺类型 Scale type	全周精度※1 Accuracy	重量※2 Weight	刻度间距 Graduation pitch
MPCIF-7036A	4秒 4 deg	2.3 kg	2度 2 deg
MPCIF-9036A		2.7 kg	
MPCIF-12036A		3.2 kg	
MPCIF-15036A		4.3 kg	
MPCI-18036A		4.8 kg	
MPCI-24072A		5.6 kg	
MPCI-34072A		7.6 kg	

适用A/D转换器 Applicable A/D converter					
连接NC NC	A/D转换器类型 Type	输出信号 Output signal	分辨率 Resolution	最高转速/间距 Max. speed/pitch	连接示例※4 Connection exaple
FANUC	ADB-20J23	序列I/F Serial interface	$2^{23}/\text{rev}$ $0.043\times 10^{-3}\text{度 deg}$	$10,000\text{ min}^{-1}/$ 2 degrees	Built-in Spindle or belt type Spindle (图5-1或图5-2 Fig 5-1 or Fig 5-2)
三菱 MITSUBISHI CNC	ADB-20J24		$0.05\times 10^{-3}\text{度 deg}$	$5,000\text{ min}^{-1}/$ 1 degree	
FANUC 三菱 MITSUBISHI CNC SIEMENS	ADB-20J16	A相、B相、Z相 矩形波输出 Digital A, B and Z phase output	C轴用 For C axis $900,000\text{P}$ $0.1\times 10^{-3}\text{度 deg}$	222 min^{-1}	C axis independent Motor (图5-3 Fig 5-3)
			$90,000\text{P}$ $1\times 10^{-3}\text{度 deg}$	$2,500\text{ min}^{-1}/2\text{ degrees}$ $1,250\text{ min}^{-1}/1\text{ degree}$	
			主轴 螺纹切削用 For thread cutting $9,000\text{P}$ $10\times 10^{-3}\text{度 deg}$ $1,024\text{P}$ $87.89\times 10^{-3}\text{度 deg}$	$10,000\text{ min}^{-1}/2\text{ degrees}$ $5,000\text{ min}^{-1}/1\text{ degree}$	

※1: 全周精度为标尺旋转一次的精度，以秒p-p表示，不包括插补精度。
※2: 重量不包括配线。
※3: 极数是标尺格栅的数量。
※4: 图5-1~-3记载在第5页。
注) 标尺的通用规格请参照第12页。

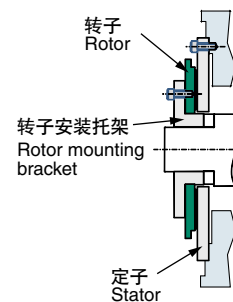
构成 Configuration



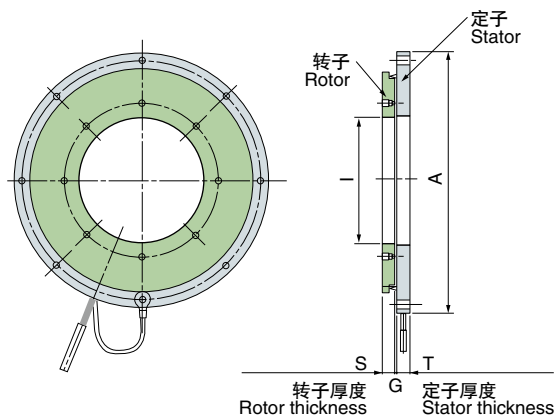
注1) 定子附有1.5m的引出线和连接器。
注2) 转接位置尽可能地要少。
注3) 提供延长电缆作为选配件。

Note 1: 1.5 m cable and connector are attached to the Stator.
Note 2: Please limit the number of relay connections as much as possible.
Note 3: The extended cables are prepared as the option.

安装事例 Mounting Example



尺寸图 Dimensions



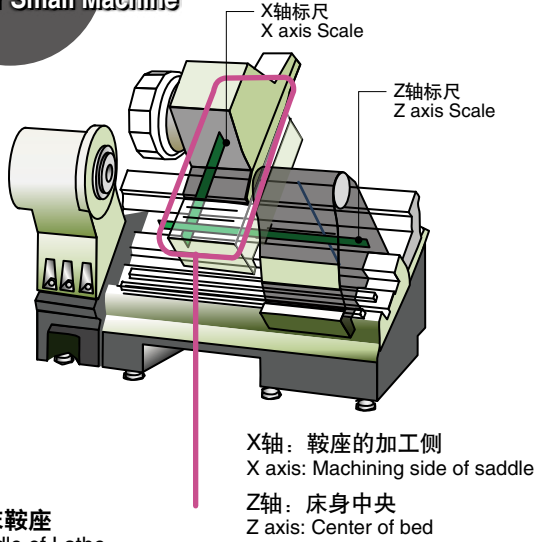
类型 Type	A (外径)	I (内径)	S (转子厚度)	G (间隙)	T (定子厚度)
MPCIF-7036A	$164_{-0.025}^0$	$70_{+0.019}^0$	10 ± 0.2	0.25 ± 0.1	10 ± 0.2
MPCIF-9036A	$184_{-0.029}^0$	$90_{+0.022}^0$			
MPCIF-12036A	$214_{-0.029}^0$	$120_{+0.022}^0$			
MPCIF-15036A	$251.7_{-0.032}^0$	$150_{+0.025}^0$	10.02 ± 0.07	0.25 ± 0.13	10 ± 0.2
MPCI-18036A	$285_{-0.032}^0$	$180_{+0.025}^0$			
MPCI-24072A	$345_{-0.036}^0$	$240_{+0.029}^0$			
MPCI-34072A	$445_{-0.040}^0$	$340_{+0.036}^0$			

注) 各部分的尺寸请参照主页或是向我们索取使用说明书。
Note: Please refer to the drawings in our homepage or request the instruction manuals from us and refer to them for the detailed dimensions.

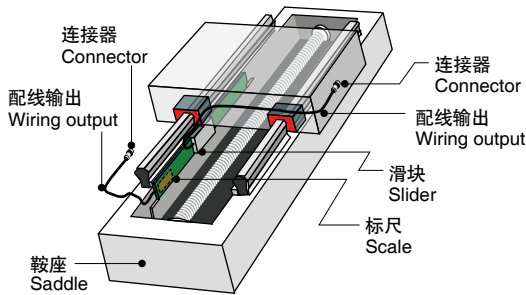
旋转 Rotary

直线MP标尺的用途与选择 Purpose and Selection of Linear MP SCALE

在小型机械中 For Small Machine



车床鞍座
Saddle of Lathe



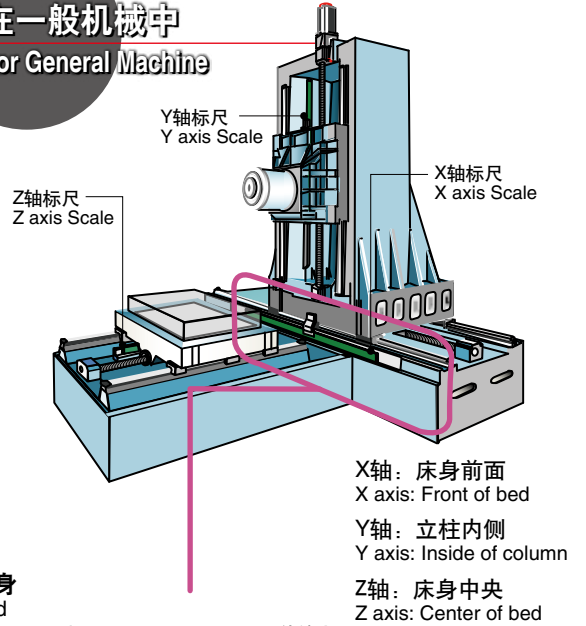
标尺的行程 Scale Stroke

行程 Stroke	MPLN系列 Series	标尺长度 Scale length
175 mm	MPLN-25ASC	252 mm
245 mm	MPLN-32ASC	322 mm
375 mm	MPLN-45ASC	452 mm
545 mm	MPLN-62ASC	622 mm

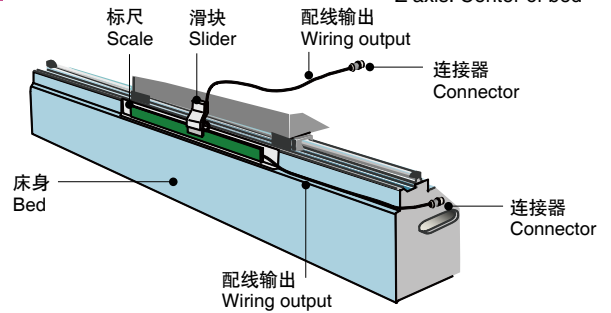
- 在行程为545mm以下的狭小位置中, 选定细MPLN系列
- When the stroke is 545 mm or less and Scale is mounted in a small place, narrow type MPLN series is selected.

MPLN 系列
MPLN series 545mm以下的行程
Stroke at 545 mm or less ▶ 参照第 13 页
Refer to page 13

在一般机械中 For General Machine



床身
Bed



标尺的行程 Scale Stroke

行程 Stroke	MPLZ系列 Series	标尺长度 Scale length	行程 Stroke	MPLC系列 Series	标尺长度 Scale length
150 mm	MPLZ-25BSC	252 mm ※	150 mm	MPLC-25BSC	252 mm ※
400 mm	MPLZ-50BSC	502 mm ※	276 mm	MPLC-37BSC	378 mm ※
650 mm	MPLZ-75BSC	752 mm	400 mm	MPLC-50BSC	502 mm ※
776 mm	MPLZ-87BSC	878 mm	526 mm	MPLC-62BSC	628 mm
900 mm	MPLZ-100BSC	1,002 mm	650 mm	MPLC-75BSC	752 mm
1,150 mm	MPLZ-125BSC	1,252 mm	776 mm	MPLC-87BSC	878 mm
1,400 mm	MPLZ-150BSC	1,502 mm	900 mm	MPLC-100BSC	1,002 mm
1,650 mm	MPLZ-175BSC	1,752 mm	1,026 mm	MPLC-112BSC	1,128 mm
1,900 mm	MPLZ-200BSC	2,002 mm	1,150 mm	MPLC-125BSC	1,252 mm

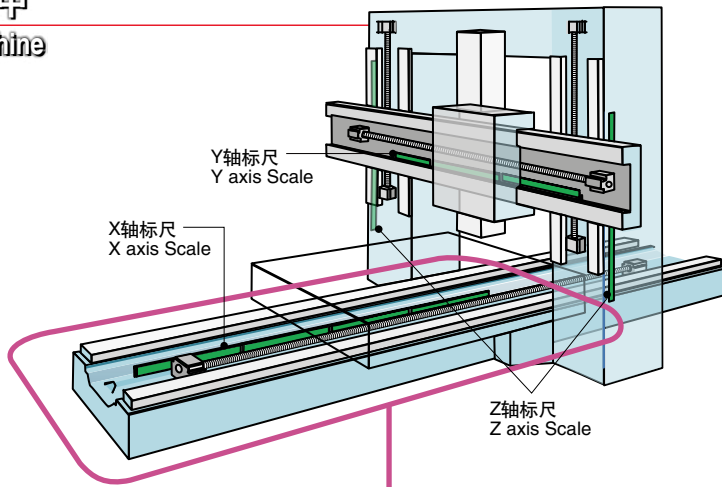
※1: 需要单独订制。Production by order

- 行程在 1,150mm 或 1,900mm 以下, 选定 MPLC 或 MPLZ 系列
- NC 为 FANUC 或三菱 CNC 时, 也可以选择 MPLC 系列和 MPLZ 系列中的任何一个。
- 除此之外的 NC, 如果是绝对值, 选定绝对值的 MPLZ 系列
- When the stroke is 1,150 mm or 1,900 mm or less, MPLC or MPLZ series is selected.
- When NC system is FANUC or MITSUBISHI CNC, both MPLC series and MPLZ can be selected.
- When the absolute system is required on other NC systems, absolute type MPLZ series is selected.

MPLC 系列
MPLC series 1,150mm以下的行程
Stroke at 1,150 mm or less ▶ 参照第 15 页
Refer to page 15

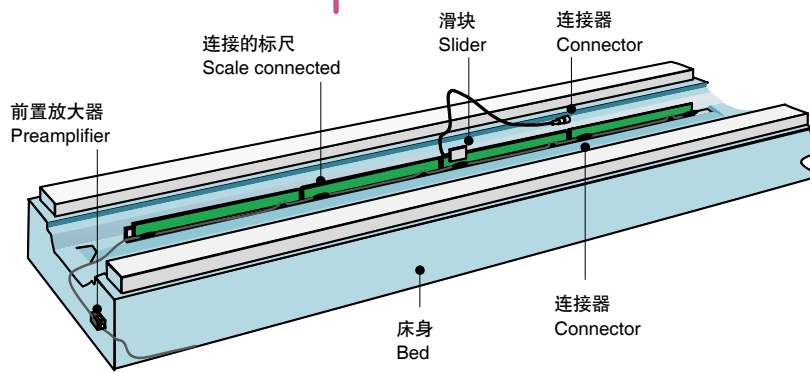
MPLZ 系列
MPLZ series 1,900mm以下的行程
Stroke at 1,900 mm or less ▶ 参照第 14 页
Refer to page 14

在大型机械中
For Large Machine



X轴: 床身中央
X axis: Center of bed
Y轴: 横梁最下方
Y axis: Lowest position on crossrail
Z轴: 两立柱2根
Z axis: Scales on both columns

床身
Bed



标尺长度 Length of Scale

MPS系列 Series	标尺长度 Scale length
MPS-25CSC	250 mm
MPS-50CSC	500 mm
MPS-75CSC	750 mm
MPS-100CSC	1,000 mm

标尺行程 Scale Stroke

从所选择的标尺长度合计中减去100mm的数值。

例) 有3根MPS-100CSC及1根MPS-75CSC时

行程: 1000mm×3根+750mm-100mm=3650mm

注) 需要前置放大器。

The stroke is value which subtracted 100 mm from the sum total of the length of selected Scales.

Ex: When MPS-100CSC is 3 pieces and MPS-75CSC is 1 piece, Scale stroke is; 1,000 mm × 3 pieces + 750 mm - 100 mm=3,650 mm

Note: Preamplifier is required.

- 行程 1,900mm 以上时, 选定可连接的MPS-C系列
- When the stroke is 1,900 mm or more, connectable MPS-C series is selected.

MPS-C系列
MPS-C series

1,900mm 以上的行程
Stroke at 1,900 mm or more

▶ 参照第 16 页
Refer to page 16

直线旋转标尺通用规格 Linear, Rotary Scale Common Specifications

项目 Item	条件 Conditions
周围温度 Ambient temperature	-10°C~70°C 注) Note:
相对湿度 Relative humidity	95%以下 Less than 95%
耐振动 Vibration resistance	变位振幅1.5mm、10~55Hz Displacement amplitude 1.5mm、10~55Hz
耐冲击 Impact resistance	55G 11m sec
IP规格 IP Code	IP67同等 IP67 Equivalent MP标尺完全采用模铸。但是, 根据切削水成分不同, 当长时间暴露时标尺主体可能会发生腐蚀, 从而无法保证产品性能。在安装设计之际, 请予以考虑。 MP scale is molded completely. However, when Scale is exposed in coolant for a long time, the copper in Scale corroded depending on the element of coolant and it may become impossible to maintain the performance of Scale. At the design of mounting, please take these into consideration.

注) MPZA系列温度范围为0°C~60°C。 Note: In MPZA series, the ambient temperature is 0°C~60°C.

直线位置检测器
Linear Feedback Detector

MPLN系列 窄型直线MP标尺

MPLN Series Narrow-type Linear MP SCALE

用途 Usage

适用于小型机械的直线轴位置检测
Position detection for linear axis of small machine

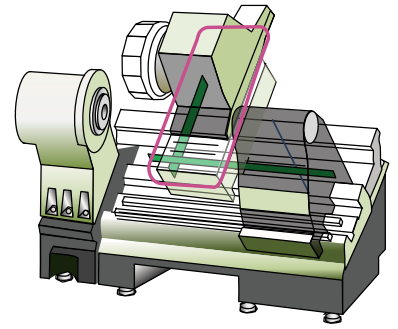
特点 Features



① 由于较细，可安装在机床的最佳位置
Get high accuracy by mounting MP Scale at the best position, as it is narrow with built-in pre-amp.



② 可与马达的备用电池编码器相组合进行绝对值检测 (FANUC和三菱CNC)
Absolute detection is possible, combining the battery backed-up encoder on the feed motor. (In case of FANUC and MITSUBISHI CNC)



车床 Turning center

规格 Specifications

标尺 Scale					
	标尺类型 Scale type	有效行程S Effective stroke S	精度 ^{※1} Accuracy	全长 L Length L	重量 ^{※2} Weight
标尺 Scale	MPLN-25ASC	175 mm	4 μm	252 mm	0.5 kg
	MPLN-32ASC	245 mm	4 μm	322 mm	0.7 kg
	MPLN-45ASC	375 mm	5 μm	452 mm	1.0 kg
	MPLN-62ASC	545 mm	6.5 μm	622 mm	1.4 kg
滑块 Slider	MPLN-75DSL			73.8 mm	0.2 kg

注) 本标尺不适于长行程(非连接型)。 Note: This scale is not connectable for long stroke.

适用A/D转换器 Applicable A/D converter				
连接NC NC	A/D转换器 类型 Type	输出信号 Output signal	分辨率 Resolution	最大应答速度 Max. speed
FANUC	ADB-K64FM	串联I/F Serial interface	0.01 μm	1,800 m/min
三菱 MITSUBISHI CNC			0.05 μm	
			0.1 μm	
各种装置 Various equipment	ADB-20J10	A相、B相、Z相短矩形波输出 Digital A, B and Z phase output	0.1 μm	80 m/min
	ADB-20J30	A相、B相模拟Z相短矩形波输出 Analog A, B and digital Z phase output	10 μm/1 cycle SIN wave	

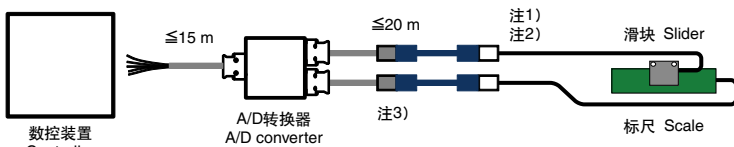
※1: 标尺精度表示μm-p, 不包括插补精度。
※2: 重量不包括配线。

※1: Positioning error shows peak-to-peak. Interpolation error (error within 1 pitch of Scale) is not included.

注) 标尺的通用规格请参照第12页。

※2: Wiring is not included in weight.
Note: Refer to page 12 for Scale common specifications.

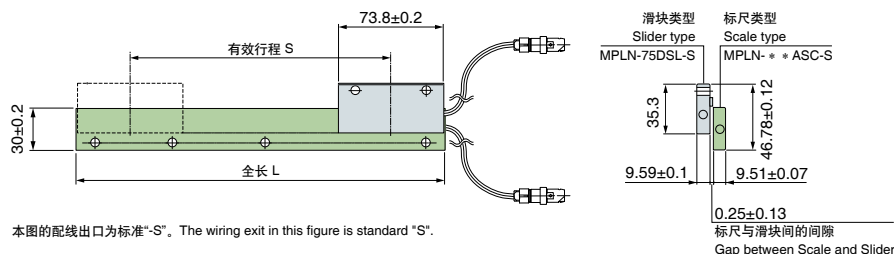
构成 Configuration



注1) 标尺和滑块附有1.5m的引出线和连接器。
注2) 前置放大器内置在标尺中。
注3) 转接位置尽可能地要少。
注4) 提供延长电缆作为选配件。

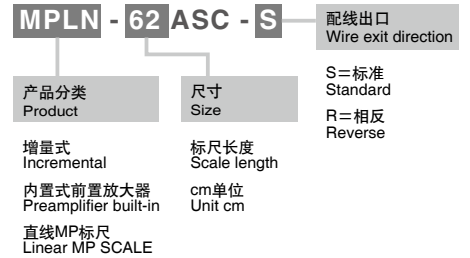
Note 1: 1.5 m cable and connector are attached to the Scale and Slider.
Note 2: Pre-amplifier is built in the Scale.
Note 3: Please limit the number of relay connections as much as possible.
Note 4: The extended cables are prepared as the option.

尺寸图 Dimensions



本图的配线出口为标准“S”。 The wiring exit in this figure is standard "S".

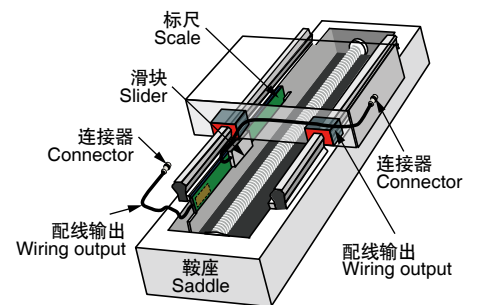
标尺类型名称 Scale Type



组合滑块类型 Slider Type



安装事例 Mounting Example



注) 各部分的尺寸请参照主页或是向我们索取使用说明书。
Note: Please refer to the drawings in our homepage or request the instruction manuals from us and refer to them for the detailed dimensions.

直线位置检测器
Linear Feedback Detector

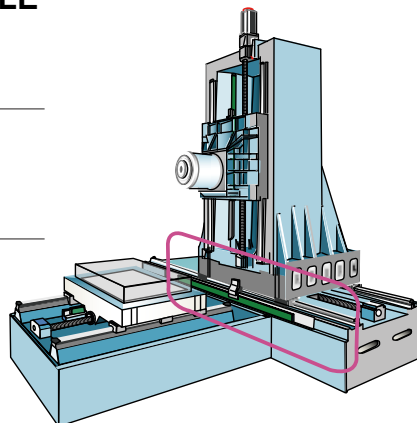
MPLZ系列 绝对值型直线MP标尺
MPLZ Series Absolute Linear MP SCALE

用途 Usage

一般机床的直线轴位置检测
Position detection for linear axis of general machine

特点 Features

- ABS** ①不需要备用电池进行绝对值检测 (SSI输出)
Absolute system without battery backup (In case of only ADB-K54S)
- High accuracy** ②高精度 5μm/1m
High accuracy 5 μm/1 m
- CNC** ③可连接至各公司的NC (FANUC、三菱CNC、SIEMENS、三菱通用伺服)
西门子 可连接至SMC-30
Connectable with various NC systems (FANUC, MITSUBISHI CNC, SIEMENS, MITSUBISHI servo)
Connectable with SIEMENS SMC30
- Dimension** ④安装孔间距同时有100mm间隔以及MPS和MPLC系列相同的间距
Scale has mounting holes of both general 100 mm pitch and pitch of conventional products.



直线 Linear

规格 Specifications

标尺 Scale					
	标尺类型 Scale type	有效行程S Effective stroke S	精度※1 Accuracy	全长 L Length L	重量※2 Weight
标尺 Scale	MPLZ-25BSC	150 mm	2.5 μm	252 mm	1.1 kg
	MPLZ-50BSC	400 mm	4.0 μm	502 mm	2.1 kg
	MPLZ-75BSC	650 mm	4.5 μm	752 mm	3.2 kg
	MPLZ-87BSC	776 mm	5.0 μm	878 mm	3.8 kg
	MPLZ-100BSC	900 mm	5.0 μm	1,002 mm	4.3 kg
	MPLZ-125BSC	1,150 mm	6.3 μm	1,252 mm	5.4 kg
	MPLZ-150BSC	1,400 mm	7.5 μm	1,502 mm	6.4 kg
	MPLZ-175BSC	1,650 mm	8.8 μm	1,752 mm	7.5 kg
MPLZ-200BSC	1,900 mm	10.0 μm	2,002 mm	8.6 kg	
滑块 Slider	MPS-100DSL			101.6 mm	0.5 kg

注) 本标尺不适于长行程 (非连接型)。 Note: This scale is not connectable for long stroke.

适用A/D转换器 Applicable A/D converter				
连接NC NC	A/D转换器 类型 Type	输出信号 Output signal	分辨率 Resolution	最大应答速度 Max. speed
SSI (SIEMENS)	ADB-K54S	串联I/F Serial interface	0.01 μm	1,800 m/min

FANUC和三菱CNC时) In the case of FANUC and Mitsubishi CNC)
连接ADB-K64FM, 作为系统可进行绝对值检查。(补偿绝对值方式)
ADB-K64FM is connected and the absolute detection is possible as the system. (Offset absolute system)

适用A/D转换器 Applicable A/D converter				
连接NC NC	A/D转换器 类型 Type	输出信号 Output signal	分辨率 Resolution	最大应答速度 Max. speed
FANUC	ADB-K64FM	串联I/F Serial interface	0.01 μm	1,800 m/min
三菱 MITSUBISHI CNC			0.05 μm	

注) 在补偿绝对值方式中, 进给马达中需要绝对值编码器。 Note: The absolute encoder is required on feed motor in the offset absolute system.

标尺类型名称 Scale Type

MPLZ - 75 BSC - S 配线出口
Wire exit direction

产品分类 Product Size S=标准 Standard R=相反 Reverse

绝对式 Absolute 标尺长度 Scale length

内置前置放大器 Preamplifier built-in cm单位 Unit cm

直线MP标尺 Linear MP SCALE

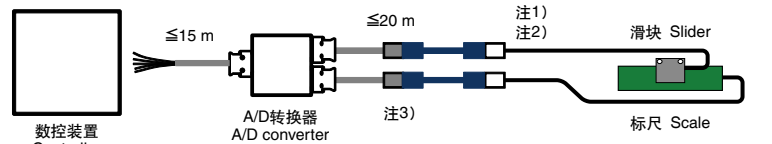
组合滑块类型 Slider Type

MPS - 100 DSL - S 配线出口
Wire exit direction

S=标准 Standard R=相反 Reverse

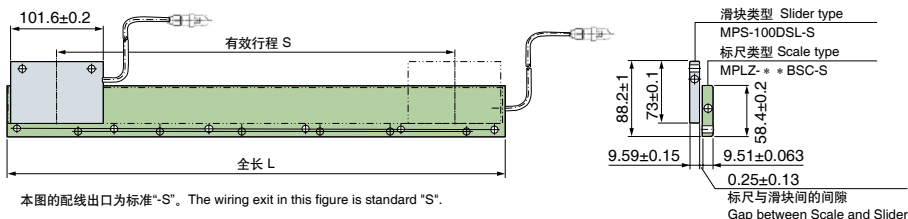
- ※1: 标尺精度表示ump-p, 不包括插补精度。
- ※2: 重量不包括配线。
- ※3: 订单生产件。
- 注) 标尺的通用规格请参照第12页。
- ※1: Positioning error shows peak-to-peak. Interpolation error (error within 1 pitch of Scale) is not included.
- ※2: Wiring is not included in weight.
- ※3: Production by order
- Note: Refer to page 12 for Scale common specifications.

构成 Configuration

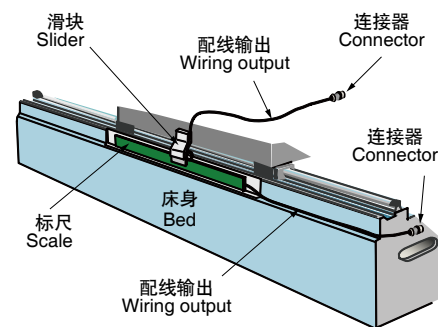


- 注1) 标尺和滑块附有1.5m的引出线和连接器。
- 注2) 前置放大器内置在标尺中。
- 注3) 转接位置尽可能地要少。
- 注4) 提供延长电缆作为选配件。
- Note 1: 1.5 m cable and connector are attached to the Scale and Slider.
- Note 2: Preamplifier is built in the Scale.
- Note 3: Please limit the number of relay connections as much as possible.
- Note 4: The extended cables are prepared as the option.

尺寸图 Dimensions



安装事例 Mounting Example



注) 各部分的尺寸请参照主页或是向我们索取使用说明书。
Note: Please refer to the drawings in our homepage or request the instruction manuals from us and refer to them for the detailed dimensions.

直线位置检测器
Linear Feedback Detector

MPLC系列 标准型直线MP标尺
MPLC Series Standard-type Linear MP SCALE

用途 Usage

一般机械的直线轴位置检测
Position detection for linear axis of general machine

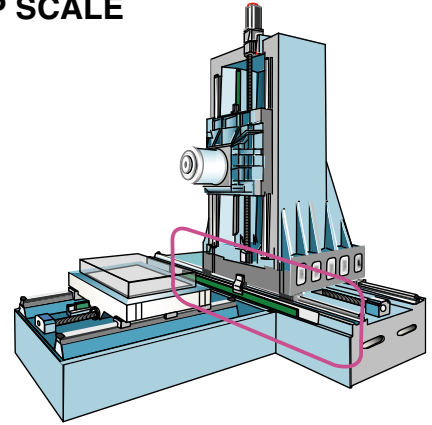
特点 Features



① 高精度 (5 μ m/1m)
High accuracy 5 μ m/1 m



② 可与马达的备用电池编码器相组合进行绝对值检测 (FANUC和三菱CNC)
Absolute detection is possible, combining the battery backed-up encoder on the feed motor. (In case of FANUC and MITSUBISHI CNC)



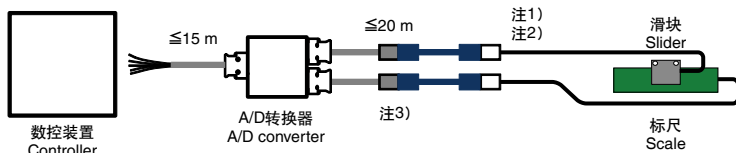
规格 Specifications

标尺 Scale					
	标尺类型 Scale type	有效行程S Effective stroke S	精度 ^{※1} Accuracy	全长 L Length L	重量 ^{※2} Weight
标尺 Scale	MPLC-25BSC	150 mm	2.5 μ m	252 mm	1.1 kg
	MPLC-37BSC	276 mm	3.7 μ m	378 mm	1.6 kg
	MPLC-50BSC	400 mm	4.0 μ m	502 mm	2.1 kg
	MPLC-62BSC	526 mm	4.5 μ m	628 mm	2.6 kg
	MPLC-75BSC	650 mm	4.5 μ m	752 mm	3.2 kg
	MPLC-87BSC	776 mm	5.0 μ m	878 mm	3.7 kg
	MPLC-100BSC	900 mm	5.0 μ m	1,002 mm	4.2 kg
	MPLC-112BSC	1,026 mm	6.5 μ m	1,128 mm	4.8 kg
	MPLC-125BSC	1,150 mm	7.5 μ m	1,252 mm	5.2 kg
滑块 Slider	MPS-100DSL			101.6 mm	0.5 kg

注) 本标尺不适于长行程(非连接型)。 Note: This scale is not connectable for long stroke.

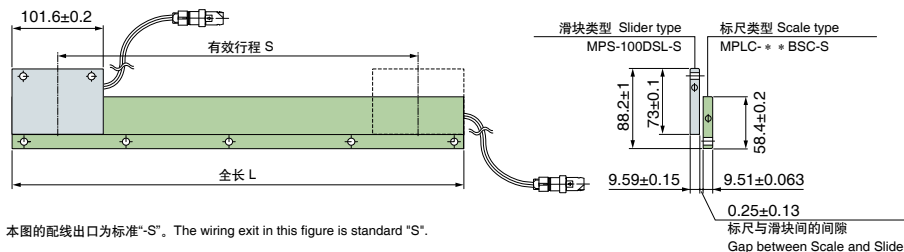
适用A/D转换器 Applicable A/D converter				
连接NC NC	A/D转换器 类型 Type	输出信号 Output signal	分辨率 Resolution	最大应答速度 Max. speed
FANUC	ADB-K64FM	串联I/F Serial interface	0.01 μ m	1,800 m/min
三菱 MITSUBISHI CNC			0.05 μ m	
			0.1 μ m	
各种装置 Various equipment	ADB-20J10	A相、B相、Z相短形波输出 Digital A, B and Z phase output	0.1 μ m	80 m/min
	ADB-20J30	A相、B相模拟Z相短形波输出 Analog A, B and digital Z phase output	10 μ m/1 cycle SIN wave	

构成 Configuration



注1) 标尺和滑块附有1.5m的引出线和连接器。
注2) 前置放大器内置在标尺中。
注3) 转接位置尽可能地要少。
注4) 提供延长电缆作为选配件。

尺寸图 Dimensions



本图的配线出口为标准“-S”。 The wiring exit in this figure is standard “-S”.

标尺类型名称 Scale Type

MPLC - 87 BSC - S 配线出口
Wire exit direction

产品分类 Product: 增量式 Incremental
尺寸 Size: 标尺长度 Scale length

内置式前置放大器 Pre-amplifier built-in
cm单位 Unit cm

直线MP标尺 Linear MP SCALE

S=标准 Standard
R=相反 Reverse

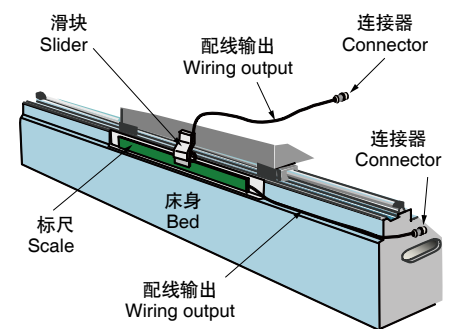
组合滑块类型 Slider Type

MPS - 100 DSL - S 配线出口
Wire exit direction

S=标准 Standard
R=相反 Reverse

※1: 标尺精度表示 μ mp-p, 不包括插补精度。
※2: 重量不包括配线。
※3: 订单生产件。
注) 标尺的通用规格请参照第12页。
※1: Positioning error shows peak-to-peak. Interpolation error (error within 1 pitch of Scale) is not included.
※2: Wiring is not included in weight.
※3: Production by order
Note: Refer to page 12 for Scale common specifications.

安装事例 Mounting Example



注) 各部分的尺寸请参照主页或是向我们索取使用说明书。
Note: Please refer to the drawings in our homepage or request the instruction manuals from us and refer to them for the detailed dimensions.

直线位置检测器
Linear Feedback Detector

MPS-C系列 连接型直线MP标尺
MPS-C Series Connectable-type Linear MP SCALE

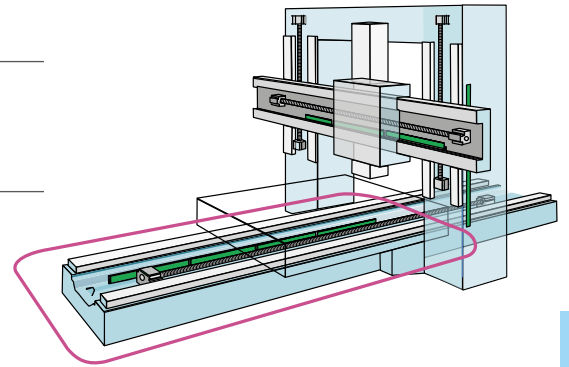
用途 Usage

大型机械直线轴的位置检测
Position detection for linear axis of large machine

特点 Features

LONG ① 可实现长行程 最长35m 使用连接器易于进行连接。
Long stroke, up to 35 m. Easy connection because of connector. ※3

ABS ② 可与马达的备用电池编码器相组合进行绝对值检测
(FANUC和三菱CNC)
Absolute detection is possible, combining the battery backed-up encoder on feed motor. (In case of FANUC and MITSUBISHI CNC)



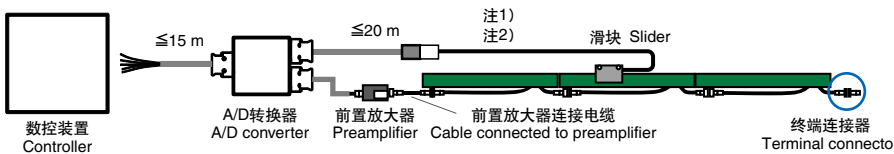
规格 Specifications

标尺 Scale					
	标尺类型 Scale type	有效行程S Effective stroke S	精度※1 Accuracy	全长 L Length L	重量※2 Weight
标尺 Scale	MPS-25CSC	250 mm × n本-100 mm	2.0 μm	250 mm	1.1 kg
	MPS-50CSC	500 mm × n本-100 mm	4.0 μm	500 mm	2.1 kg
	MPS-75CSC	750 mm × n本-100 mm	4.5 μm	750 mm	3.2 kg
	MPS-100CSC	1,000 mm × n本-100 mm	5.0 μm	1,000 mm	4.2 kg
滑块 Slider	MPS-100DSL			101.6 mm	0.5 kg

适用A/D转换器 Applicable A/D converter					
连接NC NC	A/D转换器 类型 Type	输出信号 Output signal	分辨率 Resolution	最大应答速度 Max. speed	
FANUC	ADB-K64FM ※3 ADB-20J64	串联I/F Serial interface	0.01 μm	1,800 m/min	
三菱 MITSUBISHI CNC			0.05 μm		
			0.1 μm		
各种装置 Various equipment	ADB-20J10 ※3 ADB-20J14	A相、B相、Z相短波形输出 Digital A, B and Z phase output	0.1 μm	80 m/min	
	ADB-20J30 ※3	A相、B相模拟Z相短波形输出 Analog A, B and digital Z phase output	10 μm/1 cycle SIN wave		

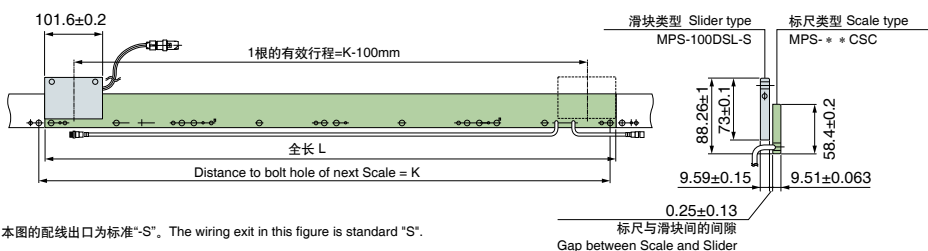
※1: 标尺精度表示μm-p, 不包括插补精度。
※2: 重量不包括配线。
※3: 标尺长度为4mm以上时, 请选择ADB-20J64或ADB-20J14。
注) 标尺的通用规格请参照第12页。
※1: Positioning error shows peak-to-peak. Interpolation error (error within 1 pitch of Scale) is not included.
※2: Wiring is not included in weight.
※3: ADB-20J14 is choosed 4 m more.
Note: Refer to page 12 for Scale common specifications.

构成 Configuration



用标尺附属的连接器, 连接标尺使用。
将终端连接器连接到连接的一端。经由前置放大器, 将另一端连接到A/D转换器。
终端连接器和前置放大器连接电缆请另行购买。
注1) 转接位置尽可能地要少。
注2) 提供延长电缆作为选配件。
Scale is connected by connectors attached to the Scale.
The terminal connector is connected to one side of the Scale and the other side is connected to A/D converter through preamplifier.
Additional order is required for the terminal connector and cable connected to preamplifier.
Note 1: Please limit the number of relay connections as much as possible.
Note 2: The extended cables are prepared as the option.

尺寸图 Dimensions



本图的配线出口为标准“S”。The wiring exit in this figure is standard “S”.

标尺类型名称 Scale Type

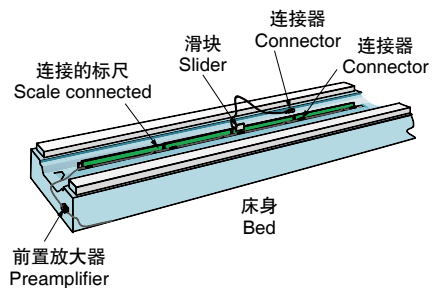
MPS - 100 CSC	尺寸 Size
产品分类 Product	标尺长度 Scale length
增量式 Incremental	cm单位 Unit cm
直线MP标尺 Linear MP SCALE	

组合滑块类型 Slider Type

MPS - 100 DSL - S	配线出口 Wire exit direction
	S=标准 Standard R=相反 Reverse

标尺行程 Scale Stroke
从所选择的标尺长度合计中减去100mm的数值。
例) 有3根MPS-100CSC及1根MPS-750CSC时
行程: 1000mm×3根+750mm-100mm=3650mm
The stroke is value which subtracted 100 mm from the sum total of the length of selected Scales.
Ex: When MPS-100CSC is 3 pieces and MPS-750CSC is 1 piece, Scale stroke is:
1000 mm × 3 pieces + 750 mm - 100 mm = 3650 mm

安装事例 Mounting Example



标尺类型 Scale type	有效行程的 计算用值 K Value for calculation of stroke K	全长 L Length L
MPS-25CSC	250	249.85
MPS-50CSC	500	499.85
MPS-75CSC	750	749.85
MPS-100CSC	1,000	999.85

注) 各部分的尺寸请参照主页或是向我们索取使用说明书。
Note: Please refer to the drawings in our homepage or request the instruction manuals from us and refer to them for the detailed dimensions.

A/D转换器 A/D Converter

A/D转换器是与MP标尺组合使用，高精度检测出机械位置，并将检测出的位置转换成各种I/F，反馈给数控装置和定位装置。

The A/D converter, in combination with MP SCALES, detects machine position with high accuracy, transforms the position into various kinds of I/F, and feeds back to NC system or positioning device.



特点 Features

- 1 出口对应** 对应CE规格认证，J型对应UL规格
Export oriented: CE compliant. J type corresponds to UL Standards.
- 2 超小外形** K型A/D转换器的体积仅为J型的1/8
Size saving: Capacity of K-type A/D converter is 1/8 compared with J type.
- 3 节能** K型A/D转换器可使用NC的5V电源，无需连接AC100V
Energy saving: Possible to use 5V power supply of NC and connection of AC 100V is unnecessary in case of K-type A/D converter.
- 4 自动插补精度补偿** K型A/D转换器自动测量插补精度后进行补偿
Automatic interpolation accuracy compensation: Measuring interpolation error and compensation automatically.

A/D转换器 A/D Converter

系列 Series	类型 Type	Linear/Rotary	对应标尺 Scale	类型 Type	外形图 Figure	绝对值 ABS	支持NC Mitsubishi	支持NC Fanuc	支持NC Siemens	支持NC SSI	输出规格 Output spec.	备注 Notes	
K型 K type	ADB-K54	Linear	MPLZ	ADB-K54S	Fig. 18-1	○			○	○	序列I/F Serial I/F	海外NC的绝对值直线轴 For linear absolute system corresponding to overseas NC	
	ADB-K60	Rotary	MPI	ADB-K60M ADB-K60F		○※1	○	○				旋转轴 For rotary axis	
	ADB-K64	Linear	MPLN, MPLC MPS, MPLZ	ADB-K64FM		○	○	○				小型机床和普通机床用直线轴 For linear axis of small and general machine	
	ADB-K70	Rotary	MPRZ	ADB-K70M ADB-K70F ADB-K70S		○	○	○					旋转轴、主要是直驱马达 For rotary axis, especially DD motor
									○	○			
J型 J type	ADB-20J10	Linear	MPLC, MPLN, MPS	ADB-20J10	Fig. 18-2	○※1	○	○	○		A/B/Z相 Pulse	直线轴 For linear axis	
		Rotary	MPI			○	○	○		旋转轴 For rotary axis			
	ADB-20J14	Linear	MPS	ADB-20J14		○	○	○			4m以上的行程直线 For long stroke 4 m more		
	ADB-20J16	Rotary	MPCI	ADB-20J16 ADB-20J23 ADB-20J24		○※2	○	○				序列I/F Serial I/F	车床主轴·C轴 For turning center spindle·C axis
									○				
	ADB-20J30	Linear	MPLC, MPLN, MPS	ADB-20J30		—			○			A/B/Z相 Pulse	海外NC用直线轴 For linear axis corresponding to overseas NC
		Rotary	MPI			○						海外NC用旋转轴 For rotary axis corresponding to overseas NC	
	ADB-20J64	Linear	MPS	ADB-20J64		○※1	○	○				序列I/F Serial I/F	4m以上的长行程直线 For long stroke 4 m more
ADB-20J82	Rotary	MPRZ	ADB-20J82	○							安川电机ΣV & Σ7 For YASKAWA ΣV & Σ7※4		

※1: 与进给马达上安装的绝对值编码器进行组合可检测绝对值。

※2: Z相在1次标尺旋转中输出1次。

※3: 在此登载的规格及尺寸值可能会不经预告进行变更，敬请谅解。在使用产品之际，请利用最新的规格书及使用说明书进行确认。

※4: 只有在直驱马达时连接到安川ΣV和Σ7。

※1: Absolute feedback system is possible by using battery-backed-up absolute encoder mounted on feed motor.

※2: Z phase is output once a rotation of Scale.

※3: Please understand beforehand that the specification and the dimension data described in this catalog may be changed without preliminary notice.

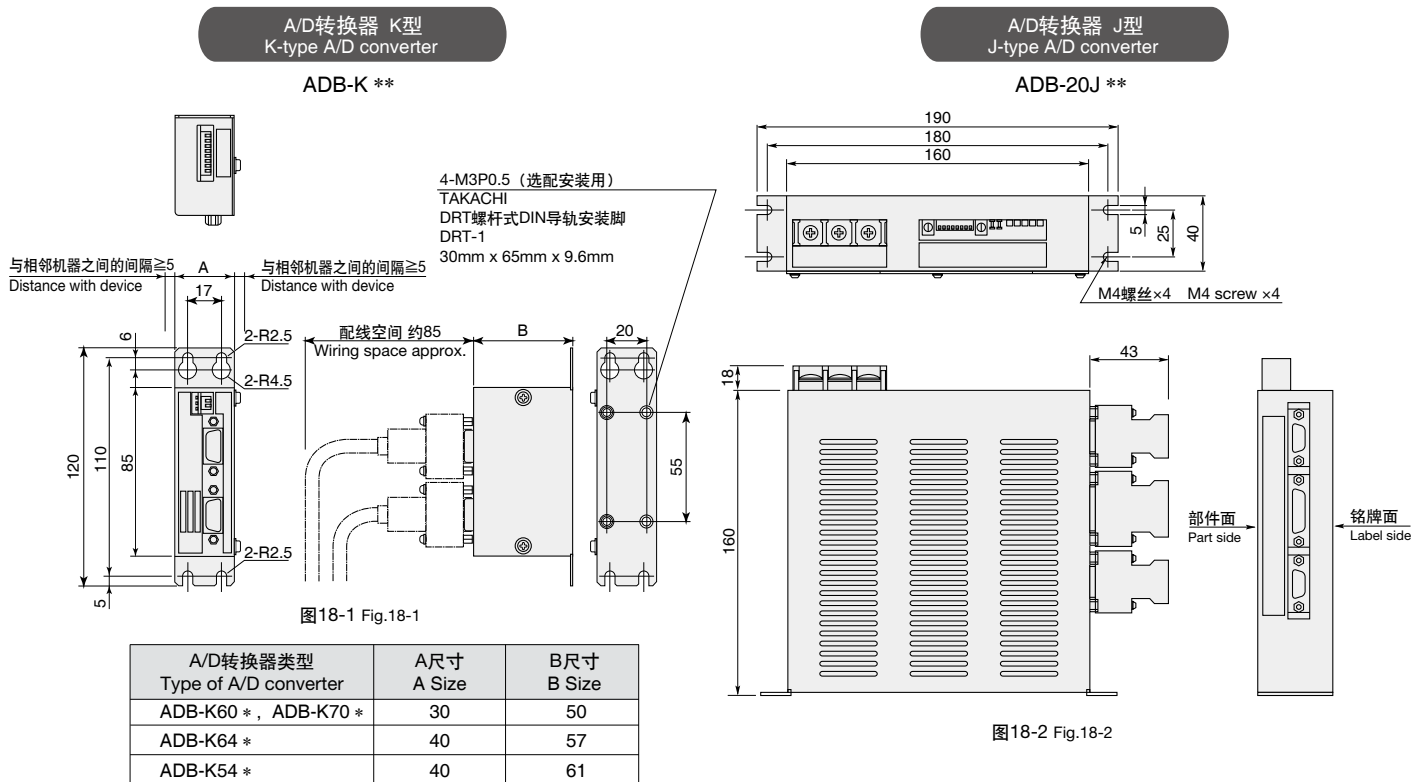
※4: Connection of YASKAWA ΣV & Σ7 is only applicable in the case of DD motor.

前置放大器型 Pre-amplifier

下列标尺需要安装前置放大器。
A preamplifier is required for following Scale.

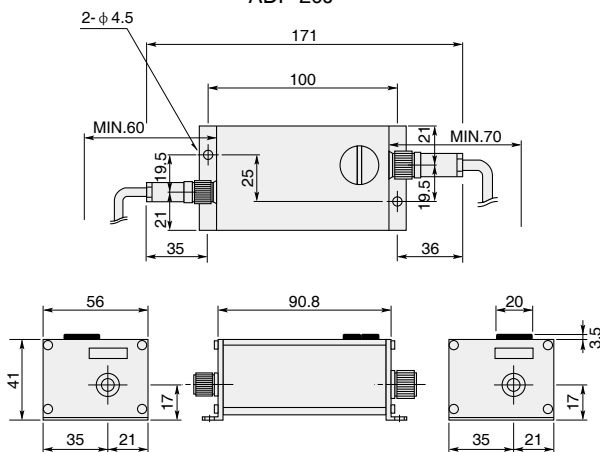
标尺类型 Scale type	A/D转换器类型 A/D converter model	前置放大器类型 Pre-amplifier type
MPS系列 MPS series	ADB-K64FM	ADP-20J14
	ADB-20J10, ADB-20J14, ADB-20J30, ADB-20J64	ADP-20J10

尺寸图 Dimensions



前置放大器
Preamplifier

ADP-20J **



规格 Specifications

项目 Item	A/D转换器 K型 ADB-K **	A/D转换器 J型 ADB-20J **	前置放大器 ADP-20J **
使用温度范围 Temperature range	0°C~+55°C	0°C~+55°C	0°C~+55°C
电源 Input power	5V±10% 0.35A	AC 100~240V±10%, 40VA, 50/60 Hz	-
重量 Weight	0.15 kg / ADB-K60 *, ADB-K70 * 0.21 kg / ADB-K54 *, ADB-K64 *	0.9 kg	0.3 kg
耐振动 Vibration resistance	加速度3G、10~55Hz Acceleration 3G, 10~55Hz 注) DIN导轨安装时除外。 Note: Does not include DIN rail.	加速度3G、10~55Hz Acceleration 3G, 10~55Hz	-



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Micro Machining Solution Group

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【保修期】

保修期为安装机械并运转1年。但是最长不超过出厂后的18个月。
此间若因本公司责任发生机械故障，提供免费维修。

【Term of guarantee】

The term of the guarantee is less than one year after the scale is equipped on the machine and the machine works, however, the maximum term of the guarantee is 18 months after the scale shipment.
When the failure occurs by the our cause within this period, we will supply the exchange product gratuitously.



产品的规格、外观等若有变更，恕不另行通知。
本产品受日本政府出口外汇及外国贸易管理法的制约。
在海外使用旋转MP标尺时，仅限于工作机械及其周边产品。
向海外出口前，请事先与尼得科机床株式会社商谈。
记载的规格、尺寸值等为参考值。请根据最新的规格书及图表为准。

Subject to change without notice.
Please contact NIDEC MACHINE TOOL CORPORATION in case of export.
Specification and dimensions for reference only.



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